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Cohen discloses an apparatus for enhancing the harmonic content of an audio signal including a *passive circuit*. . . . Garcia also discloses a similar device comprising a *passive circuit*. . . . Johnson shows the apparatus (Fig. 1) comprising a *passive circuit* (19 or 25) to provide *distortion* to the input signal . . . . Although the *passive circuit* as taught in Johnson is used for *radio frequency* . . . [o]ne skilled in the art will be able to use appropriate components to design a similar transformer circuit operated in audio frequency. Thus, it would have been obvious to one of ordinary skill in the art to *modify either Cohen or Garcia* by replacing the *passive circuit* with a transformer circuit *as taught in Johnson* operating in *audio frequency* in order to provide harmonic and a *high degree of amplification simultaneously*.

When the cited patents are properly considered for what each would teach to one of ordinary skill in the art, it becomes abundantly clear that: (1) there would be no motivation to combine the references, as suggested in the Office Action; and (2) even if combined, (a) the resulting circuit or method of distorting an audio signal would not be passive, and (b) the resulting circuit would not distort an input audio signal into an enhanced audio signal so that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality compared to audible sound reproduced from the input audio signal.

Taking each reference in turn, the Garcia patent discloses an electromagnetic field inducing coil 18 through which multiple frequency electronic audio signals are driven by an *input amplifier 16*. In the detailed description of the most preferred embodiment, it is explained that this input amplifier 16 "greatly amplifies the electronic audio signal from source 20." The audio signals driven through the coil 18 are received by a receptor coil 26 for conversion into an enhanced electronic audio signal. The resulting enhanced audio signal is then further amplified by output amplifier 28 for use by the subsequent sound reproduction equipment 24. Of course, each of these components forms a part of the circuit in this embodiment. Thus, it is respectfully submitted that the Garcia circuit is not passive.

Applicants admit that the Garcia device would distort an input audio signal into an enhanced audio signal. This distortion is a non-linear amplification of at least a portion of the frequency components of the input audio signal. Garcia, however, does not disclose, teach or suggest providing a passive circuit to effect the enhancement. In fact, Garcia indicates that

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there is only one way to effect the enhancement, i.e., by using an active magnetic coil audio energy transfer system.

The Johnson patent discloses an intermediate-frequency coupling system. The system comprises a radio frequency amplifier 11, a local oscillator 12, a modulator tube 13 which generates "a carrier [intermediate] frequency which is the difference between the frequency of the radio signal and the frequency of the local oscillator 12" (see page 2, lines 39-43); an intermediate-frequency amplifier 18 which receives the output of tube 13 via coupling system 19; a detector tube 24 which receives the output of amplifier 18 via coupling system 25; and an audio-frequency amplifier 30 which receives the output from tube 24. The coupling systems 19 and 25 include metal shields 36 which enclose inductances 32,34 and 37,38 so as to reduce the magnetic coupling between the coils (see page 3, lines 19-21). An object of the Johnson invention is to reduce coupling so as to produce a corresponding reduction in double resonance which can make "it impossible to tune the system to a single frequency" (see page 1, lines 65-67).

As noted above, the Johnson circuit includes amplifiers 11, 18, and 30. Thus, the circuit shown in Johnson is not a *passive circuit*. Indeed, the stated principal object of the Johnson circuit is to provide "a high degree of amplification" (page 1, col. 1, lines 16-17). This distinction is clearly and expressly disclosed throughout the present specification, such as at page 5, lines 6-7 ("It is desirable that no active elements be coupled between the audio source and the audio amplifier"), page 8, lines 21-23 ("The present circuit is operatively adapted to accomplish *enhancement* [of an input audio signal] *without using any active elements* such as operational amplifiers, transistors, vacuum tubes, etc. Thus, the passive circuit does not add power to the input audio signal"), and page 11, lines 24-25 ("*No active element* is connected between the source S and the audio amplifier A").

In addition to disclosing a non-passive circuit providing a high degree of amplification, it is also noteworthy that Johnson creates a circuit that seeks to provide "uniform transmission and good selectivity" among the various possible radio signal intermediate frequencies (see col. 1, lines 17-18). "Uniform transmission," as used in the context of the Johnson patent means that the frequency response curve is generally flat over the band of interest, i.e., the band containing the desired frequencies to be amplified. "Good selectivity," as used in the context of

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the Johnson patent, means that the circuit only accepts and amplifies certain frequencies falling within a very narrow band (referred to previously as the "band of interest") while rejecting all others.

In stark contrast, the passive circuit of the present invention provides neither "uniform transmission" nor "good selectivity." Uniform transmission is not effected as the passive circuit's frequency response curve is not flat over the entire band of interest, i.e., the band extending from a reference frequency up to a high frequency and/or the band extending from a reference frequency down to a low frequency. Rather, the frequency response curve of the passive circuit is non-uniform over each of these bands. Moreover, the passive circuit has no selectivity requirement as it accepts and passes substantially all frequency components within the entire band of interest. Furthermore, the Johnson circuit deals with generating radio signal intermediate frequencies rather than distorting input audio signals. For these reasons, Johnson cannot possibly teach or suggest the desirability of providing a passive circuit, as recited in the claims of the present application.

The Office Action correctly admits that the primary '113 Cohen patent fails to mention or show any form of a frequency response curve, let alone one having the characteristics expressly set forth in each independent claim under consideration. As is clearly explained in the Cohen patent, the disclosed circuit includes a harmonic selector 56, or *filter*, for passing (rather than distorting) a desired harmonic or group of harmonics from an electrical signal having a fundamental frequency such that "only a desired signal" is transmitted (see col. 4, lines 16-28 and the "Summary of the Invention" section, which states that "[t]he electrical signal . . . driv[es] or vibrat[es] the string at the *fundamental frequency* of the signal, *at some selected harmonic component thereof*, or at a mixture [of the two]"). More specifically, a signal obtained by a pickup 48 created when the string 42 is plucked is passed through this filter 56, which the Cohen patent clearly describes as a "passive or active *filter* circuit" of a type known in the art, but not specifically disclosed (see col. 4, line 21). The resulting harmonically *filtered* output signal is then passed through an amplifier 50, which amplifies the frequency components remaining after filtration. The amplified signal is then used to actuate a driver 52 that in turn produces a magnetic field corresponding to the remaining frequency components to enhance the corresponding vibrational characteristics of the string 42. From reviewing the foregoing, it is

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evident that, rather than passively shaping and distorting an input audio signal in accordance with a desirable frequency response curve, as is done in the presently claimed invention, the Cohen circuit, whether passive or active, is designed to merely select out certain portions of an input audio electrical signal. Accordingly, in no way whatsoever does the filter 56 distort the signal it receives so as to create an enhanced audio signal, as that term is taught in the present specification and recited in the present claims.

The § 103 rejection based on Cohen and Johnson will now be addressed. As noted above, Cohen discloses a bandpass filter while Johnson discloses an intermediate-frequency coupling system. Cohen's passive filter allows preselected electronic audio frequency components to pass therethrough without being amplified or otherwise distorted. Johnson's circuit accepts and amplifies in a uniform manner certain radio signal intermediate frequencies falling within a selected range while rejecting all other radio signal intermediate frequencies. The two devices perform completely different functions which are in no way related. Further, the prior art and the Office Action provide no motivation for combining the radio frequency teachings of Johnson with the audio frequency teachings of Cohen. Hence, nothing in either the Cohen or the Johnson patent would provide one skilled in the art with motivation to combine their teachings.

Even if the teachings of these references could be combined, which is denied, the resulting circuit would still not comprise the passive circuit of the present invention. The shape of the frequency response curve disclosed in Fig. 5 of Johnson is noted. However, as discussed above, Johnson specifically teaches that the principal object of his invention is to provide uniform transmission and good selectivity. In order to achieve these goals, the Johnson circuit must amplify radio signal intermediate frequencies in the band of interest in a very uniform manner such that the corresponding frequency response curve is substantially flat over that band. Cohen's filter functions to select out certain portions of an input audio electrical signal for subsequent amplification. No shaping or distorting of the signal is effected whatsoever by that filter. Hence, whatever circuit might result from the combined teachings of Cohen and Johnson, it certainly would not accept substantially all audible frequency components within the entire band of an original input audio signal and distort at least a portion of those components such that frequency components increase in amplitude as they increase in frequency from an

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intermediate frequency up to a high frequency and/or increase in amplitude as they decrease in frequency from an intermediate frequency down to a low frequency. Accordingly, it is submitted that Cohen and Johnson, whether taken singly or in combination, do not disclose, teach or suggest the subject matter set out in 1-35.

With regard to the rejection under § 103 based upon Garcia in view of Johnson, as noted above, neither patent discloses, teaches or suggests providing a passive circuit of any kind for distorting an audio signal into an enhanced audio signal so that audible sound reproduced from the enhanced audio signal exhibits a perceptively improved harmonic quality compared to audible sound reproduced from the input audio signal. Hence, the combination of Garcia and Johnson will not result in the subject matter set out in each of the present claims; therefore, this combination cannot be used to support the present § 103 rejection. Accordingly, Garcia and Johnson, whether taken singly or in combination, do not disclose, teach or suggest the subject matter set out in claims 1-35.

The Examiner's objection to Claims 24 and 35 as claiming the same invention has been noted. Claim 35 was amended in the paper filed on June 20, 2000. Accordingly, it is believed that this objection has been overcome.

It is submitted that claims 36-47 set out in the Preliminary Amendment filed on June 20, 2000 define patentable invention.

In view of the above remarks and amendments, the Applicants submit that all claims patentably distinguish over the prior art. Accordingly, an early Notice of Allowance is earnestly solicited.

Respectfully submitted,  
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